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DOCUMENTS

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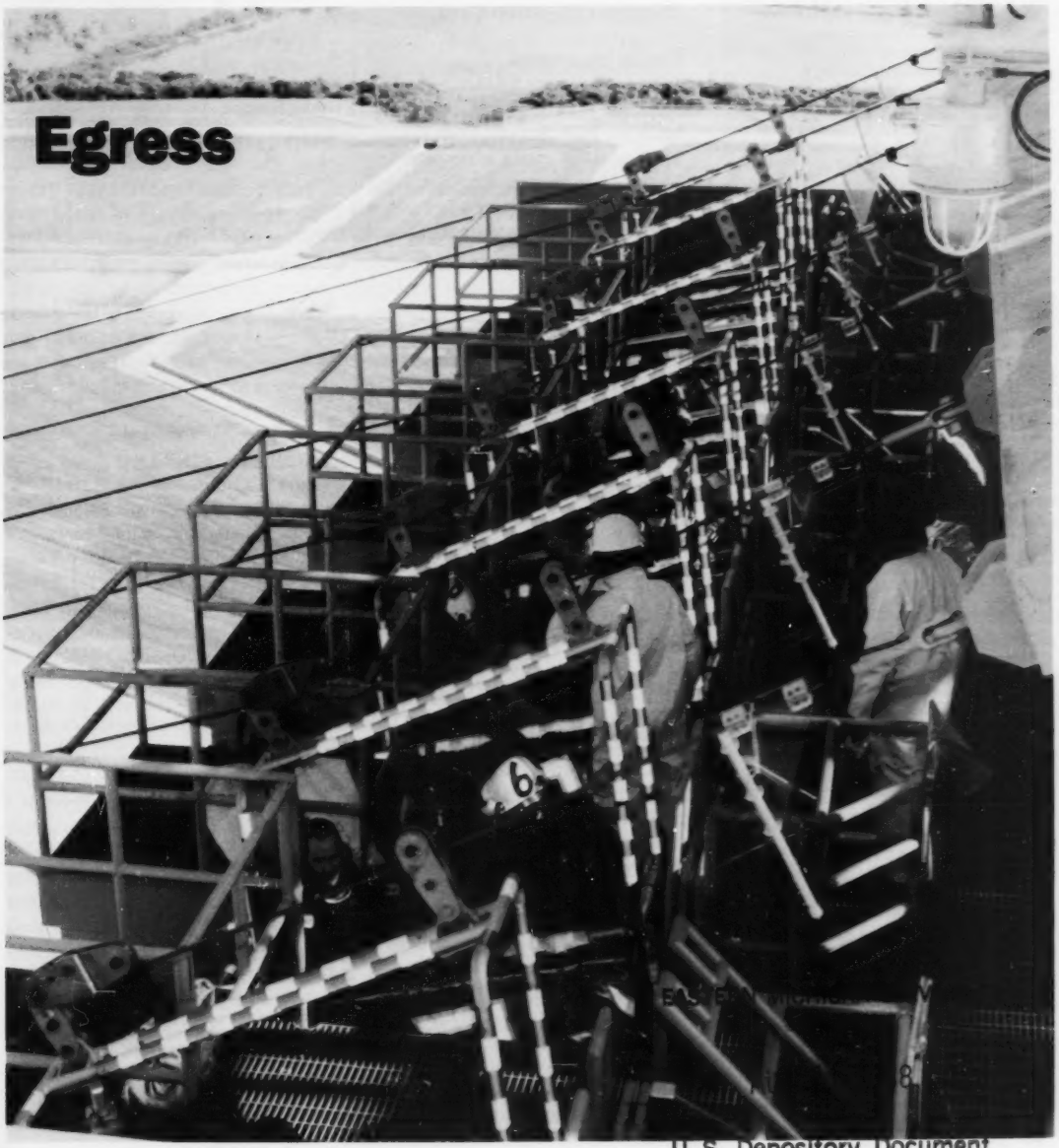

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THIS ISSUE

NASA Activities Has a New Look
We have updated NASA's employee magazine to appeal to the broad spectrum of professionals and administrators, scientists and engineers, technicians, managers and clerical workers that make up NASA's workforce. Regular features and departments have been clearly identified to make reading easier and to give the magazine a professional look. Here's a quick run-through of the magazine's contents. Take this brief tour now and enjoy a more thorough reading at your leisure. Let us know what you think. We welcome your comments.

—The Editor

This Issue—Highlights feature articles.
Contents—Lists articles. Departments listed separately.
About the Cover—Describes cover.
Subscription Block—Provides distribution and subscription information.

Features
Inside NASA— Features an inside look at one of NASA's programs providing a service to NASA's workforce.
Agency Highlights—Contains articles on NASA programs or events of interest to all employees agency-wide.
Center Highlights—Contains news and program or project highlights from NASA's field installations.

Occasional Features
Administrator's Column—Excerpts editorials and speeches delivered by the NASA Administrator.
Official Comment—Top-level managers comment on employee issues.
NASA Visions—Features photo essays.
Congressional Corner—Highlights legislative activities impacting NASA programs.
External Relations—Highlights international activities in aeronautics and space.
Mission Profile—Highlights NASA missions.
Did You Know—Acts as a forum for brief accounts of interesting or little-known facts.

Departments
Q & A; NASA Principal Investigations—Brief questions and answers on a topic under NASA investigation.
NASA News Capsules—Press release summaries based on NASA Headquarters releases.
Human Factors—Key personnel announcements, promotions, reassignments, retirements, special honors.
Another Dividend from Air and Space—NASA spinoffs.

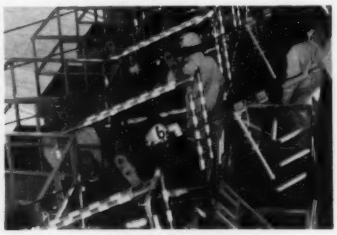
CONTENTS

Official Comment: Captain Jon McBride 3
Inside NASA: Internal Communications 4
NASA Activities Editorial Policy 5

Agency Highlights
Market for More Efficient, Supersonic Transport Projected 6
New Headquarters Operations Office Established 7
Policy and Planning Functions Move to the Administrator's Office . 8
External Fellowship Programs 8

Center Highlights
A New Name for NSTL 9
Students Will Submit Names for the New Orbiter 10
Millions May Benefit from Future Spinoffs 10
The Emergence of the Aerobrake
Some NASA Researchers Say It's Time to Slow Things Down 11
NASA Visions: Egress 13
Langley Wins Senate Productivity Award 14

Departments
Q & A 14
Congressional Corner 15
Heard from Around the World 16
NASA News Capsules 17
NASA Human Factor 19
Another Dividend from Air and Space 20



About the Cover

Egress. Astronauts and members of the orbiter close-out crews participate in simulated emergency egress exercise on the 195-foot level of the launch pad at Kennedy Space Center's Complex 39. The simulated exercise was performed to familiarize astronauts, members of the launch team and the close-out crew with evacuation routes, emergency equipment and procedures. The emergency exercises were executed to validate recent upgrades to the launch pad's emergency escape system.

NASA Activities is published bimonthly by the National Aeronautics and Space Administration for the information of the agency's employees. Contributions and recommendations are solicited from Headquarters and field centers, and should be addressed to Editor, NASA Activities, Internal Communications Branch, Code LPI, NASA Headquarters, Washington, DC 20546.

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To Measure Congressional Support

by Captain Jon McBride, Assistant Administrator, Congressional Relations Office

This year marks the 30th anniversary of NASA. With three exceptions, the Congress has funded NASA each and every year at no less than 96 percent of the budget request. This is an incredible record, and it is an extraordinary indication of congressional support for the U.S. civilian space program. Sometimes in our frenetic activity to save one or another project, to secure reprogramming authority or to convince a subcommittee to remove objectionable language, we forget this bigger, over-arching picture. We must not lose sight of the sustained and strong support of the Congress over the decades.

With this general picture in mind, let's take a look at the FY 1989 budget situation. The November Budget Summit between the President and the Congress produced an agreement whereby non-defense discretionary spending in FY 1989 was to rise only $3.5 billion above FY 1988 levels for the entire Federal Government. The NASA budget request was $11.488 billion, or $2.6 billion over the previous year's appropriated amount. The mathematics are easy here—the President asked that NASA be given the lion's portion of the Federal discretionary budget increase. It also is easy to see that these figures spell trouble on the Hill. The budget crunch and the veritable cornucopia of other Federal programs, each with its own congressional champions, have set the stage for an "uphill" budget struggle during FY 1989.

Despite our felicitous history, it is not hyperbole to assert that NASA stands at a profound crossroads. The Congress has before it several major reports which recommend that NASA aim for new, ambitious goals and be given the resources to achieve them: the Paine report, the AIAA report, and most recently the Ride report. The Congress also has before it a huge Federal deficit. The difficult choice facing the Congress boils down to whether to increase dramatically the commitment of the United States to preeminence in space or to adapt the U.S. space program to a limited budget with limited results.

Despite our felicitous history, it is not hyperbole to assert that NASA stands at a profound crossroads.

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The job of the Office of Congressional Relations is to maintain that Hill support that has nurtured NASA as a fledging agency, that has sustained us in our growing years and that will, we hope, propel us onward to greater achievements in our mature years. This job involves many, diverse, ongoing activities: the preparation of an agency witness for an appearance before a congressional subcommittee; the response to a constituent inquiry; the setting up of briefings and center visits for staff and members; the fulfillment of various statutory requirements; the scheduling of meetings; the analysis of legislation. The bottom line in our job is one of communication with the Hill—the lines between the Congress and NASA always must be open.

A policy issue this year which has kept those lines buzzing is the Commercially Developed Space Facility (CDSF), which as of now remains unresolved. NASA has received two conflicting directions: one from the Senate side to refrain from the issuance of the request for proposals for the CDSF; another from the House which advises us to proceed under certain conditions. The Office of Congressional Relations is busy trying to clear the waters on this and other situations. Past years have witnessed other salient congressional concerns—ACTS, the Hubble Space Telescope, ELV's, IUS/Centaur and of course the "Challenger" disaster. And in the years ahead, new topics, problems and issues will command the spotlight challenging those lines of communication.

The Office of Congressional Relations cannot do its job without the assistance of the entire NASA family, and it is very important that everyone understand to some extent the intricacies involved with the politics that surround us here in the Washington arena. Politics is not, has never been and never will be a pure science. ■

In this issue NASA Activities introduces a new column on NASA-related legislative activities called the Congressional Corner. A full listing of all NASA-related congressional committees and their membership appears on page 15 for the Congressional Corner's debut.

INSIDE NASA

The Office of Internal Communications

by William Sheehan, Associate Administrator for Communications

The Office of Communications has established the Internal Communications Branch at NASA Headquarters to assure that all NASA employees receive a flow of objective information.

Present efforts by the Internal Communications Branch include a weekly 5-minute television news report—**NASA UPDATE**; a summary of NASA-related news stories from major news organizations—**DAILY NEWS IN BRIEF;** and a biweekly summary of NASA news releases sent to field center house organs.

Under development for distribution to agency field centers is a 90-second audio news report that can be accessed by telephone.

David Newman and Andrea Bricca make last minute changes in the NASA Update script.

Recently, **NASA ACTIVITIES** was transferred from the NASA Media Services Division at Headquarters to the Internal Communications Branch.

The information generated by the branch is designed to supplement institutional and general information made available to employees at the agency's field centers and facilities.

James Kukowski hosts NASA Update.

At NASA Headquarters, the Internal Communications Branch publishes a twice-weekly bulletin, **NASA HEADS UP**, that is displayed at all building elevator areas. It contains a variety of institutional information for employees, e.g., training programs, seminars, lectures and other scheduled events.

The weekly **NASA UPDATE** television program is transmitted to NASA field centers over NASA Select television every Thursday for replay that day and Friday. A typical program may include a policy statement by NASA Administrator Dr. Fletcher, a status report on the Space Shuttle recovery program by Assoc. Admin. Truly, and a special science report from Ames Research Center.

Heads Up: NASA employee finds out what's happening at Headquarters.

Jim Kukowski, a veteran public affairs specialist, is host of the fast-paced television information program. It is written and produced by Dave Newman, a former ABC television producer, with the help of a Bendix Field Engineering Corp. support group.

DAILY NEWS IN BRIEF is prepared each day by Newman and Kukowski and is by far the most popular of the branch's products. Any NASA employee may access the report on NASAMAIL's "L" bulletin board. The three-page report highlights newspaper,

magazine, televison and radio news reports.

The branch is part of the Public Services Division of the Office of Communications. Jim Kukowski is Branch Chief and Dave Newman is writer-producer. Joyce Jones is branch secretary.

The growth of the Internal Communications Branch into an important component of the Office of Communications is an indication of the growing importance of the employees "right to know". Your continued support of its programs is appreciated. ■

A new look for Activities.

Editorial Policy

NASA Activities and the other center newsletters represent one of NASA's largest, continuous sources of information on agency programs. **NASA Activities** is an integral part of NASA's internal communications network and is the only publication printed on a monthly basis that reports collectively on agency-wide programs to all Headquarters and center employees, alumni and subscribers. It is a vital communication mechanism, providing feedback to employees on their contributions to the agency, its goals and objectives.

NASA Activities is a forum for general interest stories and in-depth reporting. Timely news is communicated to NASA employees through a variety of media including NASA Update, center publications and Headquarters bulletins, personnel newsletters, contractor newsletters, NASA news releases and electronic bulletin boards.

Who may submit material for NASA Activities?

Any NASA employee.

What may be submitted?

Submissions may be photos, articles, reprints of speeches, reports on NASA meetings or program activities. All submissions should be original work, unless express written approval has been obtained from the originator of the work. Articles and/or photographs that have appeared in public print and other media may not be reproduced without prior approval and proper credits.

Typical subjects covered in **NASA Activities** include organizational changes and appointments, reports on significant accomplishments of a mission or a program, policies and regulations, employee activities, career development, incentive and other awards, safety, meetings, conferences and visits.

All submissions should be relevant to NASA's programs and mission; of general interest to NASA employees; and factual in nature, not based on rumor or unverified accounts. Submissions should be typed. (Double spacing is preferred.) Photographs should be of good quality for reproduction. DO NOT SEND ORIGINALS. MATERIALS SUBMITTED WILL NOT BE RETURNED.

What is the process for sending in submissions?

Mail: Editor, NASA Activities
NASA Headquarters
Code LPI
400 Maryland Ave., SW
Washington, DC 20546

OR **Transmit** through telemail in the NASAMAIL system to:
EDITOR

Submission Deadlines

Friday, August 5	September/ October issue
Monday, October 3	November/ December issue
Friday, December 2	January issue

When is the best time to send something in?

Submissions are always welcome.

How long before I see my name in print?

Submission to NASA Activities does not guarantee that your article/photograph/report will be printed. Production time for a single issue of NASA Activities is approximately 1 month. Articles not included in the issue in progress at the time of your submission may be used in a subsequent NASA Activities.

What criteria are used for judging story submissions?

Submissions should be:
- Informative
- Lively
- Unique
- No shorter than 20 words, no longer than two pages (final print)

Final story selection is subjective. Story selection is at the discretion of the Editor. ■

AGENCY HIGHLIGHTS

From L.A. to Tokyo in Less Than 4 Hours

Market for More Efficient, Supersonic Transport Projected

Projected growth in trans-Pacific air travel would justify designing and building a new supersonic passenger airliner and placing it into service sometime between the years 2000 and 2010.

According to an 18-month study sponsored by NASA Langley Research Center, Hampton, Va., the world's next generation commercial supersonic transport would be markedly different than the Concorde which currently links North America with Europe.

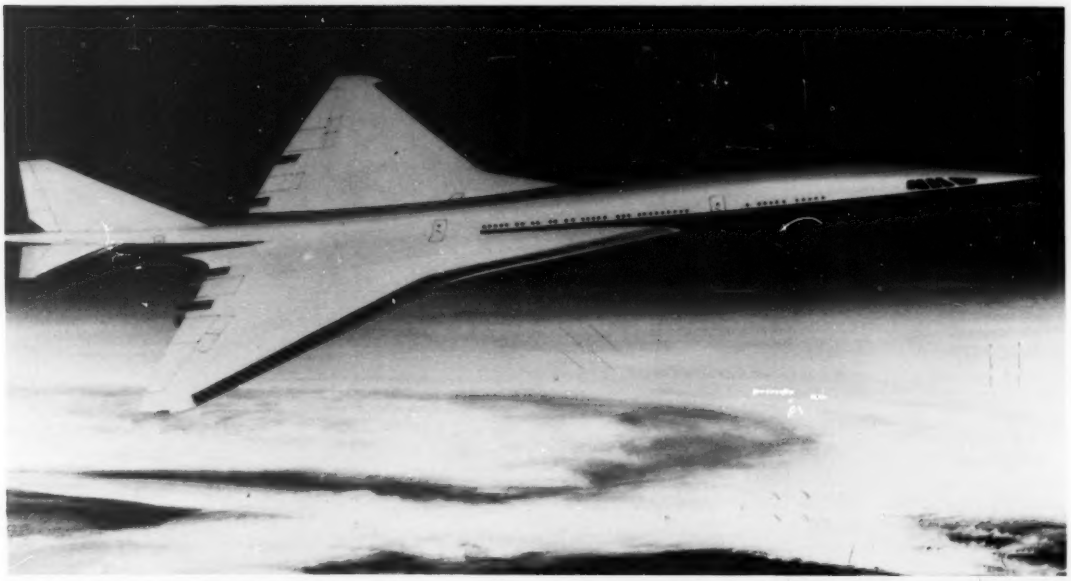
The new plane would cruise at two to three times the speed of sound and carry two to three times as many passengers up to twice as far as the Concorde. The transport also will be profitable and an environmental "good neighbor," the studies said.

The civil supersonic transports envisioned in these studies, however, should not be confused with hypersonic transports, the present focus of the National Aero-Space Plane concept, jointly under study by NASA and the Defense Department.

According to the studies conducted by the Boeing Commercial Airplane Co., Seattle, Wash., and the McDonnell Douglas Corp., Long Beach, Calif., conditions necessary to pursue the high-speed civil aircraft needs can be met. These conditions are for the Nation to aggressively pursue advanced high-speed technology development; for the air transportation market to continue its positive growth pattern; and for the U.S. industry to accept that manufacturing a high-speed civil transport makes good economic sense.

A flight from Los Angeles to Tokyo in a conventional subsonic jet takes more than 11 hours. In a Mach 2.7 aircraft, for example, the same trip would take less than 4 hours.

The Boeing studies indicate that, by the year 2000, a fleet of 1,200 large, subsonic aircraft would be needed to carry the estimated world-wide, long-range traffic of 315,000 passengers per day. By comparison, less than 800 supersonic transports, each carrying 247 passengers as far as 5,000 nautical miles, could serve the same market. The company suggests that improvements in airframe and propulsion technology should allow the range to increase to 6,500 nautical miles after a few years of service.



New aircraft would fly faster than the Concorde and carry two times as many passengers twice as far.

The studies show that flight speeds above Mach 5 are too costly and would require substantial technology development, delaying operational service. They indicate research should focus on the high-Mach range of a conventionally fueled, long-range, high-speed transport.

Timeliness in providing a viable and competitive vehicle is important for the United States to capture a major portion of the high-speed transport market, estimated to be over $200 billion. This market could be an important factor in the United States sustaining a positive balance of trade in the aerospace market.

NASA believes the increased productivity of the higher speed appears to come at too great a price and with too great a delay in reaching operational service. Consequently, NASA program managers believe research for the long-range commercial market should now focus on getting the highest speed possible out of a conventionally fueled, high-speed transport.

Results show that continued emphasis on reducing the takeoff weight is a key to achieving economic viability and environmental acceptability. Use of new, lightweight composite materials (metallics/plastics) and design innovations is very important.

The present restriction to operate high-speed transports at subsonic speeds over land stems from concerns regarding sonic boom. Results for the economic studies indicate that the market would be significantly better with an aircraft that can fly supersonically over land.

Weight reduction and aircraft shaping are the best methods of reducing the sonic boom heard at ground level. New design methods for shaping are just now becoming available. However, laws still may prohibit supersonic flight over land. In that case, the design challenge is to provide high efficiency in both the supersonic and the subsonic flight segments.

Community noise is perceived as less of a challenge than sonic boom. Present noise rules were developed with characteristics of current, subsonic transports in mind. New rules may allow high-speed transports to use some of their unique design features to advantage. Higher thrust levels, special engine nozzles and a steep climb-out could keep the takeoff noise within the airport boundaries.

Continued emphasis on reducing the takeoff weight is a key to achieving economic viability and environmental acceptability.

There are important comparisons to be made between the U.S. program in the 1960's and 1970's for supersonic transport. Many technologies are much more advanced today. Yet much research and technology development is required before any new supersonic transport could be economically successful. In fact, new technology will have to reduce Concorde-level fares (in terms of cost per passenger mile) by a factor of seven. Future work must be conducted from the very beginning with a high regard for environmental needs and economics.

Unlike the earlier program in the United States, the U.S. Government is unlikely to participate as a financial partner. However, NASA has a clear charter to identify critical technologies and to reduce the economic risk to American industry in those technology areas. It then would be up to industry to build and sell the high-speed, civil transport on their own. ■

Newly Created Office of Operations Will Provide Management Support at Headquarters

NASA Headquarters has a new Office of Operations (Code D). In May, the Office of Headquarters Operations was given responsibility for directing and coordinating institutional and administrative services necessary for the operation of NASA Headquarters. The office is run by the new Assistant Administrator for Headquarters Operations, Benita A. Cooper, who reports to the Associate Deputy Administrator (Institution). Several functions previously located in the Office of Management (Code N) have been transferred to the Office of Headquarters Operations.

This change should enhance the institutional management of NASA Headquarters by providing direct support to the Associate Deputy Administrator (Institution) in carrying out responsibilities as the senior NASA official in charge of NASA Headquarters as an institution.

Code D will provide support to the NASA Headquarters organization in the following areas:

- Administrative Services and Logistics
- Human Resources Management
- Financial Management
- Facility Management
- Health, Safety and Security
- Information Management Systems
- Executive Management Support to the Office of the Administrator
- Exchange Operations
- Headquarters Equal Opportunity Office
- Headquarters Building Consolidation Effort ■

Policy and Planning Functions Move to the Administrator's Office

The Office of Policy and Planning (Code F) was eliminated in April, with policy and planning functions transferred to the Office of the Administrator, where William Shapley controls the policy staff and Noel Hinners oversees the planning staff.

Policy Staff will provide senior support to the Office of the Administrator on policy matters and will:

- Develop and analyze alternatives to be considered in the establishment of agency policies.
- Formulate agency policies and prepare policy statements.
- Represent NASA in selected interagency policy forums.
- Coordinate, on behalf of the Office of the Administrator, selected matters involving major complex policy considerations.
- Organize and manage agency-wide or independent analyses of selected issues, positions, and policies.

Planning Staff will provide senior staff support to the Office of the Administrator on agency planning and advisory committee matters and will:

- Develop and monitor agency planning processes.
- Coordinate agency strategic planning.
- Coordinate the integrated NASA long-range program plan.
- Integrate agency institutional and planning program.
- Provide administrative overview and support for the activities of the NASA Advisory Council, the Strategic Planning Council, and other advisory bodies as required. ■

External Fellowship Programs Prepare NASA's Future Leaders

NASA participates in various education programs provided by other organizations as part of its overall executive development effort. From a modest beginning in 1959, a total of 255 people throughout the agency have participated in university fellowship programs, including the MIT Sloan program, Harvard University programs, the Federal Executive Institute, and several other university and non-university programs.

Associate administrators, center directors, and other high-ranking NASA executives are increasingly chosen from among the ranks of those who have participated in formal executive education experiences. For example, Dr. Raymond S. Colladay, former Associate Administrator for Aeronautics and Space Technology was a graduate of the 1984 Harvard Advanced Management Program, along with Dr. Howard C. Robins, Jr., Deputy Associate Administrator for Management, and Robert Aller, Associate Administrator for Space Operations. Langley Research Center Director, Richard Peterson, and Ames Deputy Director, Dale Compton, completed Sloan Fellowships—Peterson at Stanford and Compton at MIT.

External Fellowship participants are selected through a rigorous screening process, that includes interviews by a panel of top management representatives of NASA Headquarters and the centers. This Executive Development Education Panel is a subcommittee of the NASA Executive Resources Board, and makes its recommendations for selection to that Board's Chairman, the Associate Administrator for Management.

Competition for the fellowships is keen since recipients are seen as members of a "pool" from which future NASA leaders will emerge. A 1983 evaluation survey revealed that of the 41 participants responding, 7 had returned from fellowship experiences to assume positions at higher grade levels and 9 had returned to undertake increased responsibilities.

The duration of these programs ranges from 2 weeks to a full academic year. Participants receive NASA training funds as well as travel and subsistence support. Great care is exercised in the selection process so that the agency can realize the best possible return on investment. As a result, NASA has been fortunate to have many alumni from these programs assume more responsible leadership positions. ■

The Human Resources and Organization Development Office is responsible for training NASA's current and future executives. Marcia Nickols, Code ND at Headquarters, phone 453-8692, manages the Fellowship Program.

NASA Participants for the 1987-88 Academic Year

Harvard Advanced Management Program
Roy Estess, NSTL

Harvard Program for Management Development
Frank R. Bailey, ARC
Robert E. Easley, JSC

Harvard Senior Executive Program
Wayne L. Draper, JSC
John P. Smith, HQ
Mary D. Kerwin, HQ

Harvard Managers in Government
Nathaniel B. Cohen, HQ

Carnegie-Mellon Senior Executive Seminar
Clarence P. Young, Jr., LaRC
John M. Abbott, LeRC

CENTER HIGHLIGHTS

A Name Change for NSTL

President Renames NASA Center for Senator John C. Stennis

NASA's National Space Technology Laboratories (NSTL) was officially renamed the John C. Stennis Space Center by Executive Order of the President on May 20.

President Reagan signed the executive order to rename the NASA center in honor of the distinguished Mississippi senator who is retiring after 41 years of service.

The executive order acknowledges Stennis' steadfast support for the space program, stating "He has demonstrated visionary leadership and has consistently worked to assure United States world leadership and preeminence in space."

NASA Administrator Dr. James C. Fletcher said "John C. Stennis has served as the father of NSTL since he led the efforts for its creation. His leadership of the nation's space program stands as a monument to his career of significant accomplishments."

At NSTL, Director Jerry Hlass said, "Senator Stennis made major contributions to our country and our state throughout his long and distinguished career. His support to the national space program has been consistently strong since NASA's inception. His close association with our center has contributed significantly to the growth and progress we have experienced over the past 27 years. He has been a leader and strong advocate for a preeminent role in space for the United States. The senator's interest in the advancement of science and technology continues today with his support of the Space Station, our nation's next logical step into space."

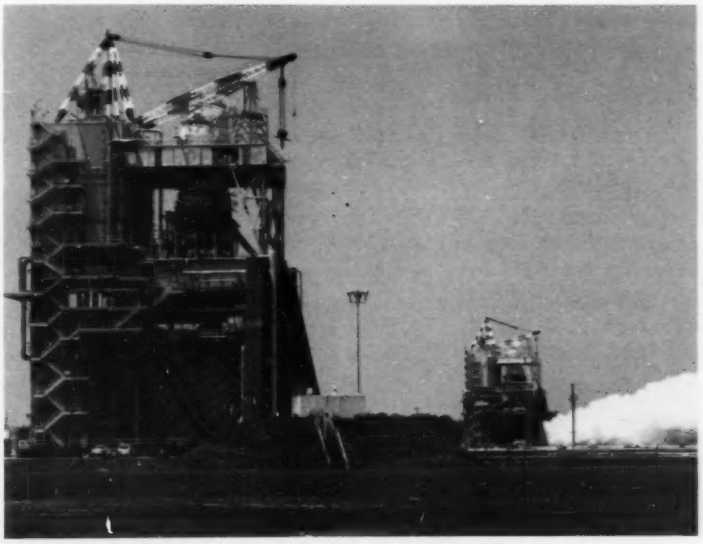
Center History

One of NASA's eight space centers, the Stennis Center location in Hancock County was chosen in 1961 to test the Saturn V first and second stages for the Apollo program. The site was designated the Mississippi Test Facility when Saturn rocket testing began. In 1974 the installation was named the National Space Technology Laboratories because of its achievements and unique capabilities in space applications and Earth resources technologies.

During the period between the Apollo and Space Shuttle programs, Stennis was instrumental in helping NASA achieve full utilization of the installation's facilities. Today, the NASA center employs more than 5,400 people and is the home of 18 Federal and state agencies engaged in environmental, oceanographic and defense-related activities.

Stennis, a frequent visitor to the space center that now bears his name, continues to support the space agency's current and future efforts. In his December 1987 "Report to Mississippians," the senator wrote, "While it is essential that we prioritize our spending and bring our federal deficit under control, we must look ahead to the future of our country."

"The next logical step in space exploration is the establishment of a permanent Space Station that will assure world leadership in space for our country in the 1990s and beyond. We must be committed to this important program that will enhance our capabilities for scientific learning while stimulating our nation's economic development and defense programs." ■



A Space Shuttle Main Engine static firing on the A-1 test stand in NSTL's test complex is shown with the A-2 stand in the foreground.

Students To Submit Names for New Orbiter

NASA, in cooperation with the Council of Chief State School Officers, issued an announcement of opportunity for America's students to participate in a national competition to name NASA's replacement Space Shuttle orbiter, scheduled to make its premiere flight in early 1992.

The Orbiter-Naming Program responds to a basic human impulse to name things.

Guidelines state that the name chosen should not only identify an American spacecraft but also should capture the spirit of America's mission in space. In honor of the seven crew members lost in the Challenger accident, the name Challenger has been retired.

To enter, elementary and secondary school students will form teams and research a name. Each team will prepare a related classroom project to support and justify the name selected.

Orbiter-naming projects are to be completed during the 1988 fall semester, and entries must be postmarked by Dec. 31, 1988. ■

Millions May Benefit from Future Space Technology Spinoffs

by Bob Lessels, MSFC

Engineers at NASA's Marshall Space Flight Center are working on a variety of programs which may benefit millions of people and enable America to maintain its position as the world's leader in high technology.

A key technology spinoff area lies in the field of medicine.

In a proposed cornea optical topographical scan system, aerospace technology is being applied to develop a low-powered laser instrument which can precisely map the cornea of the human eye and provide accurate data for use by surgeons to ensure the contour of the eye is preserved during surgical procedures. The system stems from aerospace optics techniques used in measurement of reflectance, curvature, and polish of metal and dielectric surfaces in the Hubble Space Telescope, the Advanced X-ray Astrophysics Facility and Gravity Probe B.

Working with the Veterans Administration's Department of Medicine, the Marshall Center is jointly developing a biomedical applications engineering project to develop an instrument to gauge the topography of a person's foot requiring special orthopedic footwear. The VA's Department of

Medicine sees the device as a means of providing an accurate, three-dimensional "map" to be used in fitting orthopedic shoes. It's estimated that 500,000 people in this country require special orthopedic shoes.

In a related area, aerospace robotics research at the Marshall Center may provide a low-cost method of designing, fabricating and testing a sturdy, quick-disconnect end effector that would enable unilateral below-the-elbow amputees to perform a wider variety of manual tasks. The end effector under development would be readily adapted to a "kit" of functional terminal devices that would include such things as a fishing reel crank adapter, a chain saw bar gripper and a box or crate lifting tool, for examples.

In another topography-related program, a biomedical instrument is under development at the Marshall Center which uses a specialized laser scanning technique to measure the shape of a woman's breast during treatment by a linear accelerator system. Data from the instrument would be fed immediately into the accelerator control system.

The optical scanning system requires no contact with the patient's skin. The proposed system would direct a low power amplitude modulated laser radiation beam in a computer-controlled pattern over the area to be measured. Scattered radiation from the radiated point would be detected with an optical sensor and compared, in phase, to the original modulated laser beam. The end result would be topographical data.

These are only a few of the many areas at NASA's Marshall Center in which space program-derived technologies are being transferred to the private sector to improve the quality of life for people around the world and enhance the quality of products manufactured for their use. ■

The Emergence of the Aerobrake

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Some NASA Researchers Say It's Time to Slow Things Down

by Marny S. Skora, LaRC

On the topic of spacecraft—the Shuttle, planetary probes, communications satellites—a feature sure to awe the observer is the incredible speed at which these vehicles travel. Now some NASA researchers are turning their attention to studying how to slow down a space vehicle and they are looking in an unconventional direction.

Aeroassist—or aerobrake—is the braking method under study.

Aeroassist is a generic term encompassing various maneuvers in which a vehicle is slowed down by a planet's atmosphere without making a complete entry. Scientists think the most efficient braking method to achieve a planet rendezvous is to route the vehicle through the upper atmosphere of the planet and decelerate the vehicle by use of its inherent aerodynamic drag. Typical aeroassisted

Displaying the AFE scale model in two parts are Paul M. Siemers (left), Aeroassist Flight Experiment Science Manager, holding the carrier vehicle, and Robert L. Calloway, Deputy Science Manager, holding the aerobrake. Siemers points out one of the instrumented booms located on the carrier vehicle designed to obtain base flow data.

candidate missions are return missions to Earth from locations within the inner solar system and encounters with the planets within our solar system. The vehicle which would accomplish such a mission is referred to as an aeroassisted orbital transfer vehicle (AOTV).

The concept of AOTVs has been studied since the beginning of the space era. A series of relatively recent studies, though, has focused attention on a class of missions in which a reusable AOTV would be used for the delivery and return of science payloads or cargo; servicing equipment, or transferring personnel between low- and high-Earth orbit or the Moon. Planners even envision robots on an AOTV that could fix malfunctioning satellites in orbit or bring them back to the Space Station for repair.

The concept is only feasible, however, if the vehicle can be slowed down—in an efficient manner—from the rate of speed at which it travels in geosynchronous orbit to rendezvous with communications satellites or upon return from a lunar mission to the lower speed of low-Earth orbit where the Space Station will be located. To date, NASA space vehicles have plunged through the atmosphere on launch from or reentry to Earth. Thus, there is no data base to predict how the spare gas molecules in the upper atmosphere, which should be sufficient to slow down an AOTV, will affect the speeding vehicle's aerothermal performance.

To obtain this data, NASA has initiated the Aeroassist Flight Experiment (AFE). Four NASA centers are collaborating on this $200 million in-house project that is scheduled to fly on the Space Shuttle in the mid-1990s. The AFE project is managed by the Marshall Space Flight Center. Johnson Space Center is responsible for the development of the Aerobrake, the structure that allows the spacecraft to slow down by using atmospheric drag rather than costly fuel. Ames Research Center is developing and testing heat shield materials. Langley Research Center is responsible for the definition of the science payload—the instruments that will acquire the crucial flight data—and the management of the science team consisting of researchers from the Ames, Johnson and Langley centers.

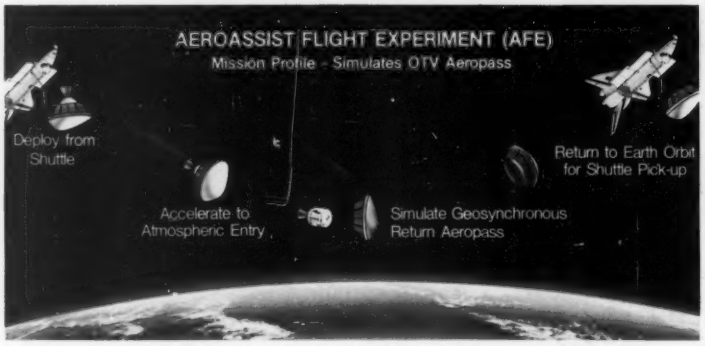
Paul M. Siemers, AFE Science Manager, says the preferred vehicle would have a large, blunt forebody, a low ballistic coefficient, be roll-controlled and recoverable. If the aerobrake can be made sufficiently light, the aeroassisted vehicle can have twice the payload capability of its all-propulsive counterpart.

The AFE Science Integration Office has been established in the Space Directorate at Langley and manages a team that spans three NASA centers and four Langley directorates. The present AFE science payload consists of 14 experiments that will obtain fundamental flow field-related data as well as thermal protection system performance data in the simulated AOTV flight environment.

Additionally, Langley has prime responsibility for the aerodynamic and aerothermodynamic wind tunnel testing required to support the development of the vehicle and science design data base. This phase of the program has been progressing over the past 3 years and is the responsibility of Bill Wells and John Micol of the Space Systems Division, Experimental Aerodynamics Branch.

Finally, Langley is providing computational fluid dynamics support to the project through the efforts of Harris Hamilton, Peter Gnoffo and Jim Weilmuenster of the aerothermodynamics branch.

Siemers stresses that, in addition to acquiring the experimental data during the atmospheric pass, a prime requirement of the AFE mission is the recovery of the vehicle and its return to Earth via the Space Shuttle orbiter for post flight inspection. After examining the vehicle and analyzing the data, NASA engineers hope to be able to design the lightest possible AOTV that will withstand the rigors of atmospheric braking. ■


AEROASSIST FLIGHT EXPERIMENT (AFE)
Mission Profile - Simulates OTV Aeropass
Deploy from Shuttle
Accelerate to Atmospheric Entry
Simulate Geosynchronous Return Aeropass
Return to Earth Orbit for Shuttle Pick-up

An Aeroassist Flight Experiment (AFE) mission scenario calls for the AFE to be deployed from the cargo bay of the Space Shuttle. A solid rocket motor (SRM) will accelerate the vehicle to 33,800 feet per second simulating the speed at which a spacecraft travels in geosynchronous orbit. After the burn, the SRM is jettisoned. A dip through the Earth's upper atmosphere is expected to slow the AFE so it can rendezvous with and be retrieved by the Shuttle. Back in the cargo bay, the AFE will be returned to Earth for in-depth analysis.

NASA VISIONS

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2.

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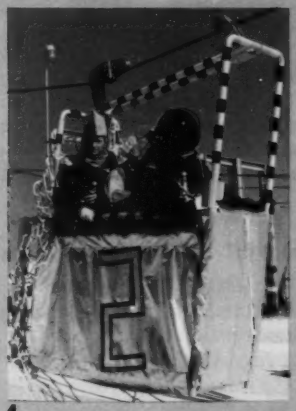

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1. Astronauts and members of the orbiter close-out crew participate in simulated emergency egress exercise on the 195-foot level of the launch pad at Kennedy Space Center's Complex 39. The simulated exercise was performed to familiarize astronauts, members of the launch team and the close-out crew with evacuation routes, emergency equipment and procedures. The emergency exercises were executed to validate recent upgrades to the launch pad's emergency escape system. **2.** Out of the starting gate . . . **3.** Triage site is set near the Mate/Demate Device. **4, 5.** Astronauts enter M1-13 personnel carrier. **6.** Fire/Rescue team practices procedures for scenario in which orbiter lands at remote KSC site and flight crew needs assistance leaving the orbiter. **7.** Simulated emergency at Shuttle Landing Facility. ■

Q&A

The following questions and answers are excerpted from interviews conducted for NASA's radio program, The Space Story.

New Engines to New Worlds

If we want to explore New Worlds, we'll need new spaceships to get us there. This simple fact is one of the main reasons behind NASA's Pathfinder Program, major new multi-year effort to start developing the tools for 2lst century space missions today.

Q Why do we need "smart spacecraft engines"? How would the space vehicles of the next century differ from today's Space Shuttle?

A According to the Director for Technology in NASA's Office of Exploration, Ed Gabris, "We need to have an engine that we can use many times, and one that can tell us its own health status. We all know how the idiot lights and the gauges work on a car. Well, it turns out on rocket systems we haven't had the ability to do that. We've had very limited instrumentation. But now what we need is a device with sensors and computers that will say after a flight, here's what the status of this propulsion system is, and can tell us whether it can do the next mission or not. And if it can't, it's got to tell us what we can do to fix it."

Gabris says, "We're talking about a factor of 6 to 8 improvement. Now this is also low thrust type of propulsion, where the total force will be less than a pound, as opposed to say 50,000 pounds with the chemical systems. But how we make up the difference is we thrust for a very long period of time. Where the chemical systems will go for say minutes, the electrical propulsion will go for months, and get exactly the same change in velocity we would get with the chemical systems."

Lunar Oxygen Pilot Plant Conceptual Design. A program to manufacture lunar oxygen would involve a series of development stages on Earth and on the Moon.

Silver Snoopy

The Manned Flight Awareness program is one of the largest and most visible motivational programs that NASA has. According to the chairman of NASA's Manned Flight Awareness Program, A.T. Danessa, the program started during the Mercury days in response to early astronauts' wish to identify people contributing to astronaut flight safety.

Q What is a Silver Snoopy?

A A "Silver Snoopy" is the Astronauts' Personal Achievement Award presented to individuals who have performed an outstanding effort contributing to the success of the manned space flight missions. The contribution may or may not be related to specific tasks.

The Snoopy Award includes a silver pin in the form of Snoopy wearing a space helmet and space suit, a certificate, and a letter of commendation personally signed by an astronaut citing appreciation of the astronauts for outstanding performance.

Nominations for the award are submitted by employee peers and management and are selected in compliance with published criteria. The Snoopy emblem reflects NASA and industry's sense of responsibility and continuing concern for astronaut flight safety.

Langley Wins Senate Productivity Award

Langley Research Center was recognized as a finalist in the public sector category of the U.S. Senate Productivity Award in April for its efforts to improve quality and productivity.

The U.S. Senate Productivity Award was established to recognize organizations with effective productivity and quality improvement efforts, to share these efforts with other organizations, and to contribute to the productivity and quality improvement in the Commonwealth of Virginia. ■

CONGRESSIONAL CORNER

Meet the Members of NASA-Related Congressional Committees

The Congressional Corner is written and edited by the Congressional Relations Office.

United States Senate

Committee on Appropriations

John C. Stennis (D-MS), Chairman
Mark O. Hartfield (R-OR), Ranking Minority

Subcommittee on HUD-Independent Agencies

Democrats

William Proxmire (WI), Chairman
John C. Stennis (MS)
Patrick J. Leahy (VT)
J. Bennett Johnston (LA)
Frank R. Lautenberg (NJ)
Barbara A. Mikulski (MD)

Republicans (5)

Jake Garn (UT), Ranking Minority
Alfonse M. D'Amato (NY)
Pete V. Domenici (NM)
Charles E. Grassley (IA)
Don Nickles (OK)

Committee on Commerce, Science and Transportation

Democrats (11)

Ernest F. Hollings (SC), Chairman
Daniel K Inouye (HI)
Wendell H. Ford (KY)
Donald W. Riegle (MI)
J. James Exon (NE)
Albert Gore, Jr. (TN)
John D. Rockefeller, IV (WV)
Lloyd D. Bentsen (TX)
John D. Kerry (MA)
John B. Breaux (LA)
Brock Adams (WA)

Republicans (9)

John C. Danforth (MO), Ranking Minority
Bob Packwood (OR)
Nancy Landon Kassebaum (KS)
Larry Pressler (SD)
Ted Stevens (AK)
Bob Kasten (WI)
Paul S. Trible, Jr. (VA)
Pete Wilson (CA)
John R. McCain (AZ)

Subcommittee on Science, Technology and Space

Democrats (6)

Donald W. Riegle (MI), Chairman
Albert Gore, Jr. (TN)
John D. Rockefeller, IV (WV)
Lloyd D. Bentsen (TX)
John D. Kerry (MA)
Brock Adams (WA)

Republicans (4)

Larry Pressler (SD), Ranking Minority
Nancy Landon Kassebaum (KS)
Paul S. Trible, Jr. (VA)
Pete Wilson (CA)

U.S. House of Representatives

Committee on Science, Space and Technology

Democrats (29)

Robert A. Roe (NJ), Chairman
George E. Brown, Jr. (CA)
James H. Scheuer (NY)
Marilyn Lloyd (TN)
Doug Walgren (PA)
Dan Glickman (KS)
Harold L. Volkmer (MO)
Bill Nelson (FL)
Ralph M. Hall (TX)
Dave McCurdy (OK)
Norman Y. Mineta (CA)
Buddy MacKay (FL)
Tim Valentine (NC)
Robert G. Torricelli (NJ)
Rick Boucher (VA)
Terry L. Bruce (IL)
Richard H. Stallings (ID)
James A. Traficant, Jr. (OH)
Jim Chapman (TX)
Lee H. Hamilton (IN)
Henry J. Nowak (NY)
Tom McMillen (MD)
David E. Price (NC)
David Nagle (IA)
Jimmy Hayes (LA)
David E. Skaggs (CO)
Paul E. Kanjorski (PA)
George J. Hochbrueckner (NY)

Republicans (4)

Manuel Lujan, Jr. (NM), Ranking Minority
Robert S. Walker (PA)
F. James Sensenbrenner, Jr. (WI)
Claudine Schneider (RI)
Sherwood L. Boehlert (NY)
Tom Lewis (FL)
Don Ritter (PA)
Sid Morrison (WA)
Ron Packard (CA)
Robert C. Smith (NH)
Paul B. Henry (MI)
Harris W. Fawell (IL)
D. French Slaulghter, Jr. (VA)
Lamar Smith (TX)
Ernest L. Konnyu (CA)
Jack Buechner (MO)
Constance A. Morella (MD)
Christopher Shays (CT)

Subcommittee on Space Science and Applications

Democrats (15)

Bill Nelson (FL), Chairman
George E. Brown, Jr. (CA)
Harold L. Volkmer (MO)
Norman Y. Mineta (CA)
Robert Torricelli (NJ)
James A. Traficant, Jr. (OH)
Jim Chapman (TX)
Carl C. Perkins (KY)
Tom McMillen (MD)
David R. Nagle (LA)
James H. Scheuer (NY)
Ralph M. Hall (TX)
David E. Skaggs (CO)

Republicans (9)

Robert S. Walker (PA), Ranking Minority
Ron Pakcard (CA)
Robert C. Smith (NH)
D. French Slaughter, Jr. (VA)
Ernest L. Konnyu (CA)
Jack Buechner (MO)
Joel Hefley (CO)
Constance A. Morella (MD)
Tome Lewis (FL)

Subcommittee on Transportation, Aviation and Materials

Democrats (5)

Dave McCurdy (OK), Chairman
Dan Glickman (KS)
Bill Nelson (FL)

Tom McMillen (MD)
Jimmy Hayes (LA)

Republicans (3)
Tom Lewis (FL), Ranking Minority
Robert S. Walker (PA)
F. James Sensenbrenner, Jr. (WI)

Subcommittee on Investigations and Oversight
Democrats (6)
Robert A. Roe (NJ), Chairman
Harold L. Volkmer (MO)
David E. Price (NC)
George E. Brown, Jr. (CA)
James A. Traficant, Jr. (OH)
(Vacancy)

Republicans (4)
Don Ritter (PA), Ranking Minority
F. James Sensenbrenner, Jr. (WI)
Ron Packard (CA)
Ernest L. Konnyu (CA)

Subcommittee on International Scientific Cooperation
Democrats (6)
Ralph M. Hall (TX), Chairman
Marilyn Lloyd (TN)
Buddy MacKay (FL)
Robert G. Torricelli (NJ)
James H. Scheuer (NY)
Richard H. Stallings (ID)

Republicans (4)
F. James Sensenbrenner, Jr. (WI), Ranking Minority
Sherwood L. Boehlert (NY)
Ron Packard (CA)
Harrs W. Fawell (IL)

Committee on Appropriations
Jamie L. Whitten (D-MS), Chairman
Silvio O Conte (R-MA), Ranking Minority

Subcommittee on HUD-Independent Agencies
Democrats (6)
Edward P. Boland (MA), Chairman
Bob Traxler (MI)
Louis Stokes (OH)
Lindy Boggs (LA)
Alan B. Mollohan (WV)
Martin Olav Sabo (MN)

Republicans (3)
Bill Green (NY), Ranking Minority
Lawrence Coughlin (PA)
Jerry Lewis (CA)

■

EXTERNAL RELATIONS

Heard from Around the World

JAPAN TESTS SRB FOR NEXT GENERATION ROCKET—On April 15, the National Space Development Agency of Japan (NASDA) successfully carried out a ground test of the solid rocket booster (SRB) engineering model for its next generation H-II launch vehicle. This test represents a significant milestone in the development of the H-II rocket which has its first test flight scheduled for 1992.

The test took place at NASDA's Tanegashima Space Center for a duration of 92 seconds. The SRB generated a maximum power of 177 metric tons and maximum pressure of 50 kg/square cm.

FRANCE PUTS ARIANE BACK IN BUSINESS—Ariane flight 21, an Ariane 3 configuration, launched from Kourou Space Center in French Guiana this spring put France back in the space business after nearly a year's hiatus. The successful deployment of two telecommunications satellites on Ariane 21 was followed by the deployment of two Intelsats on flight 23, and the launch of an Ariane 4 carrying Meteosat P2, Amsat, and PanAmsat.

Following the fourth consecutive Ariane success, France's Minister for Post, Telecommunications and Space was quoted as saying, "The four [successful] Ariane shots, after an interruption in launches of nearly a year, proves the viability of the launcher and puts Europe in a very good world position, because Arianespace holds 56 percent of the world's orders..."

V24, an Ariane 3, carrying the Insat 1-C, is scheduled for July 20.

INDIA-BUILT LANDSAT IS LAUNCHED BY THE SOVIET UNION—On March 17, 1988, the first of the Indian Remote Sensing Satellite series, the IRS-1A, was launched by the Soviet Union from its Baikonur Cosmodrome. The Indian Space Research Organization (ISRO) plans to operate this indigenously developed satellite of approximately 950 kg in a polar sun-synchronous orbit of 904 km.

The IRS-1A carries three cameras: one LISS-I with a resolution of 72.5 meters and a swath of 148 km, and two LISS-II's with a resolution of 36.25 meters and a combined swath of 145 km. India's National Remote Sensing Agency (NRSA) will receive data from the IRS-1A at its Shadnagar facility near Hyderabad. The IRS series is a crucial component of India's National Natural Resources Management System, a national science and technology project to obtain, analyze, and utilize remote sensing data. NASA expects to have access to IRS-1A data for research purposes in return for NASA's earlier provision to ISRO of limited quantities of SIR-B and Large Format Camera imagery of India.

ITALIAN SPACE OFFICIALS CONFIRMED BY NEW GOVERNMENT—The new Italian Government, headed by Prime Minister deMita, confirmed the appointments made in October 1987 of Dr. Antonio Ruberti, Minister of Scientific and Technological Research (MRST), and of Leacro Saporito, MRST Undersecretary.

SPACE AGENCY APPROVED—The Italian Parliament passed a bill in May to establish the Italian Space Agency (ASI). The law brings all Italian space activities (domestic and international programs) and control of Italy's $600 million per year space budget under one agency. On May 31 Dr. Fletcher and other NASA officials met with a senior delegation from Italy headed by Deputy Science Minister Saporito. ■

NASA NEWS CAPSULES

News Capsules are NASA news releases edited by the Internal Communications Section, Office of Communications.

NASA/ESA Solar and Space Plasma Physics Investigators Selected

NASA and the European Space Agency (ESA) have selected the scientific investigations to be conducted on two spacecraft programs as part of a joint NASA and ESA solar terrestrial research program.

This joint program represents a major, coordinated research effort to understand the generation of solar electromagnetic energy, magnetic fields and particles and their transmission through interplanetary space into the Earth's magnetosphere.

More than 130 U.S. scientists will be participating in the two space flight missions called Solar and Heliospheric Observatory (SOHO) and Cluster, a set of four spacecraft.

The Cluster mission will investigate the space plasma three dimensional microphysics phenomena in Earth's magnetic field environment, using the four identical spacecraft in polar orbits.

SOHO will be placed at the Earth-sun LaGrangian point and will investigate the physical processes that form and heat the solar corona and give rise to the solar wind.

Cluster is planned for launch in December 1995, using the European Ariane launch system. SOHO will be launched by NASA in March 1995, using either the Space Shuttle or an expendable launch vehicle.

Hot Test. Shuttle "engine out" test underway in Lewis's 10 X 10 foot supersonic wind tunnel in March. Model is a 2 1/4full stack, hot tested to study structural loads, aerodynamics, air flows and pressure loads.

Perspective Display System Developed for Spacecraft Maneuvers

A computer-generated display system, to aid close-in spacecraft maneuvers, has been developed at NASA's Ames Research Center. The display can precisely depict a spacecraft's position relative to other vehicles and objects, allowing rapid, accurate monitoring and response.

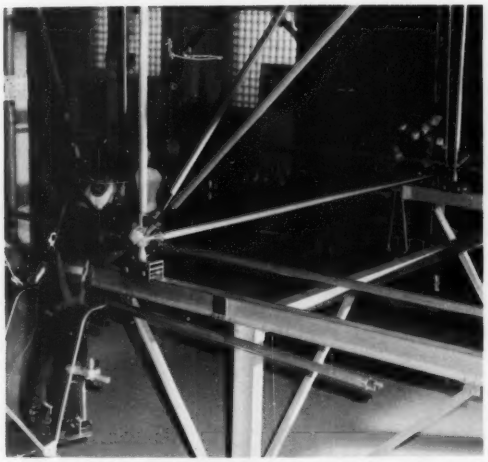
The system can be placed aboard spacecraft such as the planned U.S. Space Station. It would help in conducting and monitoring maneuvers within 1 mile of the Space Station. These "proximity operations" include docking and berthing orbital vehicles and rendezvous between two or more vehicles.

NASA Announces 2-Year Astronaut Selection Cycle

NASA has announced plans to conduct astronaut candidate selections on a 2-year cycle and has scheduled the next class of candidates for 1990. Previously, NASA has selected astronaut candidates as needed.

The 2-year process will moderate the demand on resources required for candidate selection and training while maintaining the manpower levels necessary to meet mission requirements. The next selection cycle will begin July 1, 1989, the cutoff date for applications. Applications received after that will be eligible for consideration in the next cycle.

Application can be obtained by writing to the NASA Lyndon B. Johnson Space Center, Astronaut Selection Office, AHX, Houston, TX 77058.



Astronauts James Voss (left) and Sherwood "Woody" Spring assemble a Space Station truss structure in Langley's Structures Laboratory using the center's version of a Mobile Transporter.

NASA Plans Acquisition of Advanced Solid Rocket Motor

NASA has submitted to the Congress its acquisition plan for the Space Shuttle Advanced Solid Rocket Motor (ASRM). The plan contains NASA's strategy for a full and open competition to introduce an ASRM into the Shuttle system. This will result in substantive improvements in flight safety design margins, reliability and performance.

The ASRM request for proposals (RFP) — for ASRM design, development, test and evaluation (DDT&E) — is planned for June/July 1988 to achieve an earliest launch opportunity in fiscal 1994.

The ASRM's design goal to provide a 12,000 pound payload increase will equate to an additional 2.4 equivalent Shuttle missions per year (at a rate of 14 missions per year) and will support Space Station deployment and other critical missions.

Proposals for the ASRM development will be solicited to include a Government facility to be designed, built and operated by the selected contractor on a Government site for ASRM test and production.

The overall ASRM DDT&E cost is estimated at just under $1 billion, including modern tooling and equipment, plus $200-300 million for construction of facilities.

Fletcher Says Moon, Not Mars, May Be Better First Step

NASA Administrator, Dr. James Fletcher, said recently that the Moon, rather than Mars, may be the best initial destination for possible U.S./USSR manned missions. "Going to the moon together would give the two leading spacefaring nations in the world an opportunity to build a stable base for further cooperation, which could, one day, lead to a cooperative mission to Mars," he said.

Dr. Fletcher stresses that any cooperative manned activity should be preceded by a program of cooperative unmanned activities.

"Flying out to Mars together before building such a foundation could, for several reasons, be less practical," Dr. Fletcher told participants at the National Space Symposium in Colorado Springs, Colo. In the last several months, a number of parties have advocated a U.S./USSR manned mission to Mars. Dr. Fletcher said relations between the United States and Soviet Union have yet to demonstrate that degree of stability.

NASA Administrator Sounds Alarm on Proposed Budget Cuts

"The civil space program will be stopped in its tracks" if Congress approves a FY 1989 NASA budget level now being considered by the House of Representatives, NASA Administrator Dr. James C. Fletcher warns. "Lack of adequate funding for NASA will literally paralyze the program and bring to a halt the 30 years of progress that began after the shock of Sputnik in 1957."

Dr. Fletcher, who has said repeatedly that this is a "make or break" budget year for NASA, issued his toughest warning yet about the consequences of reducing the NASA funding levels proposed by the Administration.

"The fact is that the American civil space program—your space program—and the source of so much American pride, prestige, and scientific and technological progress, faces a crisis unparalleled in its lifetime," he said at a Capitol Hill symposium. "We will fall even further behind at a time when the Soviet Union, Japan and our European allies are moving steadily ahead."

"It is not a pretty prospect to imagine the United States as a second-rate or even a third-rate power in space. But that is what this country will quickly become if Congress doesn't act responsibly and give NASA the resources it needs to do its job," the NASA Administrator said.

HUMAN FACTORS

Cooper Heads New Headquarters Office

Benita A. Cooper will be the Assistant Administrator for the new Office of Headquarters Operations established on May 8, 1988.

As the AA for Headquarters Operations, Cooper will be responsible for directing and coordinating all institutional and administrative support necessary for the operation of NASA Headquarters and will report to the Associate Deputy Administrator (Institution).

Since October 1980, she has been the Director of Management Operations at the Goddard Space Flight Center (GSFC) with responsibility for providing administrative and institutional management for that Center. She joined NASA in 1968 as a Management Intern at NASA Headquarters and in 1970 moved to GSFC in the personnel organization where she became the Director of Personnel in 1973. She served as the Assistant Executive Officer to the Deputy Administrator of NASA for 2 years and returned to GSFC in 1979 as the Deputy Director of Administration prior to moving to her recent position at GSFC.

Reeves Returns to Headquarters as Director of Planning

Richard A. Reeves has been named Director of Planning in the Office of the Administrator. While assuming this new responsibility immediately, he will continue to act as Associate Director at the Ames Research Center until his current assignments are completed sometime in August.

As Director of Planning, Reeves will lead senior staff support for the Associate Deputy Administrator (Institution) on agency planning and advisory committee matters.

Since November, 1985 he has been serving as Associate Director at Ames, with the primary responsibility for providing executive leadership for the center's institutional functions.

Ames Engineers Honored for Deicing Invention

Leonard A. Haslim and Robert D. Lee were honored as NASA's 1987 Inventors of the Year at the March 31, 1988 meeting of the Inventions and Contributions Board.

Haslim works for the Advanced Plans and Programs Office at Ames Research Center. Lee retired from Ames in 1985. Their invention, the "Electro-Expulsive Separation System" (EESS), is capable of separating a solid body like ice from the surface of a resilient film member in which overlapping electrical conductors are embedded.

The invention has been heralded by the aircraft industry as a useful means of removing hazardous surface ice. EESS represents an advance over presently available aircraft deicers because of its ease of installation and low power requirements.

NASA's Executives Receive Presidential Rank

On Thursday, May 12, NASA honored 35 Presidential Rank award recipients for outstanding performance in the Senior Executive Service. In addressing the winners, Dr. James E. Colvard, Assistant Director for Tactical Systems at the Johns Hopkins University's Applied Physics Laboratory told NASA leaders, "Science is not a singular endeavor—it is a team effort."

Presidential Rank awards are granted to career SES members whose achievements are consistently exceptional. Only 1 percent of all SES employees may earn the rank of "Distinguished Executive" and are awarded $20,000. Another 5 percent may be named "Meritorious Executives" and receive $10,000.

NASA's 1987 Distinguished Executives are C. Thomas Newman, HQ; John J. Quann, GSFC; Paul F. Holloway LaRC ; and Harvard Lomax, ARC.

NASA's 1987 Meritorious Executives are James R. Thompson, Jr., MSFC; Robert O. Aller, HQ; Bill D. Colvin, HQ; Franklin D. Martin, HQ; Thomas J. Lee, MSFC; James H. Trainor, GSFC; Richard J. Wisniewski, HQ; Charles P. Blankenship, LaRC; Charles T. Force, HQ; Henry E. Clements, HQ; Cecil C. Rosen, III, HQ; Edward E. Richley, LeRC; Roy S. Estess, NSTL; Thomas L. Moser, HQ; Joseph B. Mahon, HQ; John W. Thomas, MSFC; Percy J. Bobbitt, LaRC; William C. Keathley, GSFC; Arnold D. Aldrich, HQ; Joseph C. Sharp, ARC; Joseph S. Algranti, JSC; James A. Downey, III, MSFC; Gerald W. Longanecker, GSFC; J. Stuart Fordyce, LeRC; Charles J. Pellerin, Jr., HQ; Donald R. Puddy, JSC; Charles Tulip, Jr., HQ; Jeffrey D. Rosendahl, HQ; Salvatore J. Grisaffe, LeRC; Walter W. Guy, JSC; Richard H. Kohrs, HQ.

ANOTHER DIVIDEND FROM AIR & SPACE

Mini-TV Screens in Wraparound Sunglasses

Space Technology Aids in Improving Low-Vision Eyesight

Research and development in aeronautics and space have provided numerous benefits for all Americans, and at a tiny percentage of the tax dollar. Here is an example:

NASA and the Johns Hopkins Wilmer Eye Institute, Baltimore, Md., will use space technology to develop a device designed to improve the sight of millions of people with low vision.

Scientists at NASA's National Space Technology Laboratories (recently renamed the John C. Stennis Center), Miss., and Wilmer scientists plan to adapt technology used for computer processing of images from satellites and head-mounted imaging systems originally developed for NASA Space Station projects to enhance vision.

According to officials in NASA's Technology Utilization Program, the new collaborative project is expected to run at least 5 years and cost a minimum of $5 million in its first phases.

The project will be carried out for NASA by NSTL's Earth Resource Laboratory, the installation's research and development organization.

The planned device, the Low-Vision Enhancement System, will resemble "wraparound" sunglasses and will custom-tailor images of the outside world for low-vision patients. A version of the enhancement system is expected to be available to patients through clinical tests in a few years.

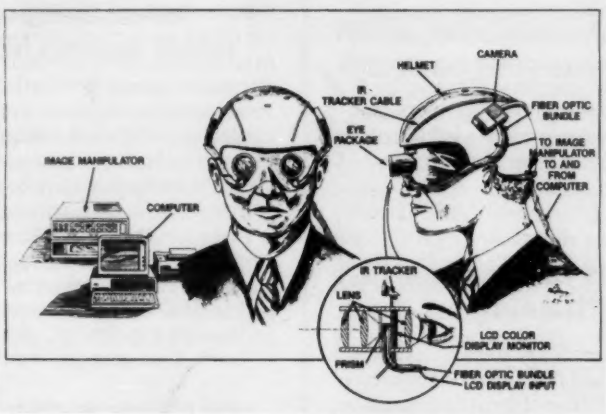
Approximately 11 million Americans have visual defects that cannot be corrected medically, surgically or with glasses. Severe impairment that causes disability, called low vision, affects 2.5 million Americans, according to Eye Institute officials.

The transfer of NASA's technology will make it possible to improve the visual capability of low-vision patients by appropriately enhancing and altering images to compensate for the individual patient's impaired eyesight.

When the device is worn, the patient will see the world on two miniature color television screens where the lenses of eyeglasses usually are located. Lenses and imaging glass fibers will be embedded on each side of the "wraparound" section where the front and ear pieces join.

The lenses will form images of the scene in front of the patient on the surface of the fibers. The fibers, similar to those used to carry long-distance telephone signals, carry pictures back to miniature solid-state television cameras carried in a belt or shoulder pack. The images are processed by a small, battery-powered system in the pack and, finally, displayed on the television screens.

As planned, the device will be lightweight and comfortable. The outside of the television screens will be similar to mirrored lenses in sunglasses.



The system is expected to benefit patients who have lost their peripheral or side field of vision, such as those suffering from glaucoma, an increase of fluid pressure inside the eye that damages the optic nerve, and from retinitis pigmentosa, a progressive degeneration of the retina, the delicate light-sensitive nerve layer lining the eye. The system also is expected to benefit patients with central vision loss, the part of vision normally used for reading. These patients may have macular degeneration associated with aging, or diabetic retinopathy, in which diabetes causes swelling and leakage of fluid in the center of the retina.

Ongoing Wilmer research supported by the National Eye Institute will provide information on how images must be altered and enhanced for the low-vision patient.